The computation of the trajectory of the guided bullet including deceleration due to air drag and calculation of the target position including elevation angle, and the determination of the optimum aiming direction is straightforward and reduced to practice and would require no further explanation to those reasonably skilled in this art.

From the above it can be seen that the laser-guided bullet of the present invention provides a method and system for guiding a small caliber projectile to an optimum trajectory along which the same would impact a hostile target. The guided bullet includes a self-contained guidance system capable of generating a correctional signal by means of a dedicated semiconductor logic circuit which actuates piezo electric steering surfaces on the bullet to translate the projectile toward the optimum trajectory.

The guided bullet of the present invention utilizes ballistic and navigational technologies which are in a practical state of development.

Because of the degree of precision that is required in the fabrication of the guided bullet and the small scale of the work, micro electromechanical manufacturing offers the potential for the lowest production cost of the present invention.

The terms "forward", "rearward", and so forth have been used herein merely for convenience to describe the present invention and its parts as oriented in the drawings. It is to be understood, however, that these terms are in no way limiting to the invention since such invention may obviously be disposed in different orientations when in use.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of such invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. A bullet guidance system for guiding an in-flight bullet along an optimum trajectory along which said bullet would impact a laser-identified target, said system comprising:

laser beam detecting means contained within said bullet and being capable of receiving laser beam energy reflected from said target and converting said energy to electrical impulses;

logic circuit means contained within said bullet having means therein responsive to receipt of said impulses for determining the deviation of said bullet from said optimum trajectory and for generating corrective signals in response to said impulses;

steering control means having means therein responsive to said corrective signals in a manner to actuate said steering control means so as to deflect air flow about said bullet, said control means including at least deployable flap means being outwardly extensible from said bullet to deflect air flow about said bullet to impart a correctional momentum to translate said bullet to said optimum trajectory, said bullet being fired from a precision, smooth-bored weapon thereby not imparting axial spin to said bullet in the manner of a rifle; and

power supply means contained within said bullet being interconnectable to said logic circuit and said steering control means to provide sufficient electrical power to produce the functions required by said system.

2. The bullet guidance system of claim 1 wherein said detecting means includes a plurality of laser sensors being symmetrically disposed about a longitudinal axis of said bullet, said sensors being located in a plane perpendicular to the axis and being arranged to receive said laser beam

energy in an opposite direction to the direction in which said bullet is moving.

3. The bullet guidance system of claim 1 wherein said logic circuit means includes amplification means being integrated thereto for amplifying said impulses received from said detecting means.

4. The bullet guidance system of claim 1 wherein said logic circuit means includes amplification means and is contained in a semiconductor chip within said bullet.

5. The bullet guidance system of claim 4 wherein said semiconductor chip is installed on a flat plate means on a forward side thereof, said plate means being located in a plane perpendicular to said axis of said bullet.

6. The bullet guidance system of claim 1 wherein said deployable flap means are at least partially fabricated from piezo electric materials enabling said flap means to be expanded when subjected to said corrective signals.

7. The bullet guidance system of claim 1 wherein said power supply means is a miniature battery contained within said bullet.

8. The bullet guidance system of claim 7 wherein said battery is a lithium-polymer battery.

9. The bullet guidance system of claim 1 wherein said bullet is propelled by a powder cartridge.

10. The bullet guidance system of claim 9 wherein said cartridge is a 0.50 caliber cartridge.

11. A method of guiding an in-flight bullet along an optimum trajectory to a laser-identified target, said bullet including a self-contained guidance system including laser detection means capable of receiving laser beam energy and converting said energy to electrical impulses, logic circuit means responsive to receipt of said impulses for determining the deviation of said bullet from said optimum trajectory and for generating corrective signals in response to said electrical impulses for actuating steering control means in a manner to deflect air flow about said bullet thereby effecting a corrective momentum to translate said bullet to said optimum trajectory, said method comprising the steps of:

illuminating the target with a laser;

firing said bullet from a precision sniper rifle having a smooth internal bore at said target;

detecting laser beam energy reflected from said target using laser sensors;

converting said energy to electrical impulses;

determining the deviation of said bullet from said trajectory by analysis of said electrical impulses;

generating corrective signals in response to said electrical impulses; and

actuating said steering control means in response to said corrective signals in a manner to deflect air flow about said bullet to impart a correctional momentum to said bullet whereby said bullet is translated toward said optimum trajectory to impact said target.

12. The method of claim 11 wherein the step of detecting is carried out by a plurality of laser sensors symmetrically disposed about a longitudinal axis of said bullet.

13. The method of claim 11 wherein the step of converting is carried out by photo detector elements within said sensors.

14. The method of claim 11 wherein the step of determining is carried out by a semiconductor logic circuit.

15. The method of claim 11 wherein the step of determining is carried out by piezo electric materials integrally formed with said control means.

16. The method of claim 11 wherein the step of firing further includes propelling said bullet to said target by use of a powder charge.

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